



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
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February 15, 2007

Mr. Thomas Macchiarella, Code 06CA.TM
Department of the Navy
Base Realignment and Closure
Program Management Office West
1455 Frazee Road, Suite 900
San Diego, CA 92108-4310

**RE: Draft Data Gap Sampling Workplan for OU-1, OU-2A, and OU-2B,
Alameda Point**

Dear Mr. Macchiarella:

Please find enclosed EPA's comments from the review of the above referenced document. The Workplan was prepared by Tetra Tech EC, Inc and submitted by the Navy on November 3, 2006. EPA requested a 30 day extension to the review period, making comments due on February 2, 2007. EPA forwarded an electronic copy of our comments to you on February 1, 2007 and is following up with this cover letter and enclosed hard copy of the comments.

It was very helpful to discuss the resolution of major comments generated by the agencies for the OU 2C sampling Workplan prior to submittal of formal RTCs and the draft final version of the Workplan. We would like to take the same approach to resolving the comments submitted for the OU-1, 2A and 2B Workplan.

If you have any questions, please call me at (415) 972-3029.

Sincerely,

A handwritten signature in cursive script, appearing to read "Anna-Marie Cook".

Anna-Marie Cook
Remedial Project Manager

enclosure

cc list next page

cc list: Steven Peck, Navy
Dot Lofstrom, DTSC Sacramento
Erich Simon, RWQCB
Peter Russell, Russell Resources, Inc
George Humphreys, RAB Co-Chair
Karla Brasaemle, TechLaw Inc
John Chesnutt, EPA

**EPA Review of the Draft Data Gap Sampling Work Plan
for OU-1, OU-2A, and OU-2B, Alameda Point**

GENERAL COMMENTS

1. Natural Attenuation parameters are mentioned generally in the text of Section 5 of the Draft Data Gap Sampling Work Plan for OU-1, OU-2A, and OU-2B (the Work Plan) but the specific parameters that are considered to be appropriate measures of Natural Attenuation are not listed. Please specify the natural attenuation parameters in the text of the document.
2. Throughout the Work Plan, flexibility in the sampling scheme is provided for through the use of "professional judgment" to determine things such as monitoring well placement, additional sampling locations, sample depths, and so on. While professional judgment is certainly an important asset during field work, and while it is impossible to predict every possible scenario prior to field operations, additional information regarding situations where professional judgment may be required and the criteria that will be used should be included in the Work Plan. These criteria should be developed using the data quality objectives (DQO) process. Please provide additional descriptions of decision logic, inputs, etc in cases where "professional judgment" may be in order. For example, rather than saying "additional first water bearing zone (FWBZ) monitoring wells may be installed using professional judgment based on the results of direct push technology (DPT) soil and groundwater sampling", please use the DQO process to develop specific criteria that will be used to determine whether another monitoring well is appropriate and revise the text to include these criteria.
3. The 2 and 20 times screening criteria factors for groundwater plume delineation appear arbitrary; additional discussion and justification is needed to substantiate these numbers. In addition, please consider that in some cases the full vertical extent of a plume down to below MCLs needs to be delineated for remedial design purposes.
4. Please clarify the discussion throughout the text regarding the FWBZ, the SWBZ and the BSU. For Sites 9, 13, 16, 19, 22, 23 and most of Site 4 the BSU is not present and there is no differentiation between the FWBZ and SWBZ. Most of these sites have groundwater contamination which needs fuller vertical and lateral delineation. The proposed method of installing wells in the "FWBZ" and the "SWBZ" and down to the BSU does not really apply, from a hydrogeologic standpoint, to these sites. Please revise while also keeping in mind that part of the reason for further investigation of the groundwater is to delineate the plumes to MCLs both laterally and vertically.
5. Information presented on tables should be referenced and discussed in the corresponding text for consistency and readability. Throughout this report, the

information presented in tables does not consistently match that discussed in the text. Additionally, in some cases, new information is presented, such as groundwater sampling at multiple depths, but not discussed in the text. When information is presented in this way, there is no opportunity to discuss the rationale behind these recommendations, and it is therefore difficult to evaluate their effectiveness. Specific comments are presented below.

SPECIFIC COMMENTS

1. **Page 1-1, second paragraph:** Suggest revising this paragraph to state that additional field work will be performed to assess the tarry refinery waste at Site 13 in order to complete the FS phase and support remedial design. Please include a description of the activities that will be performed in support of this goal and document where the results of the investigations will be presented so as to be used in the FS.
2. **Page 1-2, first bullet:** Please include that groundwater will also be investigated as part of the SWMU data collection activities.
3. **Table 1-3a, OU-1 Solid Waste Management Unit Sampling Summary Table:** In the last column the "Current Navy Sampling Recommendation" for Solid Waste Management Unit (SWMU) OWS-040B, should be more specific. The entry currently reads, "Characterization combined with OWS-040A," which appears to indicate that only one set of samples will be collected for both oil water separators (OWSs), however the recommendations should be described individually in this table. In addition, the recommendation for WD-040 indicates that this characterization is combined with OWS-40A and OWS-40B. Further, WD-041A is combined with OWS-041 and WD-114 was combined with OWS-114. The last column, the sampling recommendation, should include the media and number of samples each OWS, wash down (WD) area, and for underground storage tank (UST) UST (R)-18/NAS GAP 17. Please provide more detailed recommendations for these data gaps in Table 1-3a.
4. **Table 1-4 Data Gap Sampling Summary:** The text in the last column, Potential Field Activity, is missing the last lines of many of the entries. As a result, a complete review of this table is not possible. Please format the table so that all of the text is visible and if possible, provide it for Regulatory Agency review before the next version of the Work Plan is issued.
5. **Table 1-4 Data Gap Sampling Summary:** Data Gap No. 12 (page 4) includes defining the source and extent of metals in groundwater at Site 9 by performing additional data review, but Section 5.2.1.4 (Site 9 Groundwater Investigation) includes additional sampling to delineate groundwater contamination at Site 9. Please revise this recommendation in Table 1-4 to include additional sampling as a means to address Data Gap 12.

6. **Table 1-4, Data Gap Sampling Summary Table; Table 1-6, Data Gap Summary Table; and Section 5.2.1.4 Site 9 - Groundwater Investigation (Data Gaps 11, 12, 13, 14, and 17), Pages 5-17 and 5-18:** The "Data Gap" column in Table 1-4 for Data Gap 11 states "The lateral and vertical extent of sitewide groundwater contamination including VOCs, SVOCs, PCBs, and metals has not been delineated." However, PCBs are not included in the analyses listed for this data gap on Table 1-6 nor are they mentioned in the text. Please resolve this discrepancy.
7. **Table 1-5, SWMU Site Sampling Locations, Depths, and Analyses:** Table 1-5 indicates that the soil and groundwater samples collected from sampling location OWS-547 in OU-2A, Site 22, will not be analyzed for methyl tert butyl ether (MTBE), but due to the proximity of OWS-547 to the former service station at Site 22 and the fact that MTBE has been in use since the 1970s, soil and groundwater samples from this area should also be analyzed for MTBE. Please add MTBE to the list of analyses for OWS-547.
8. **Table 1-6, Data Gap Sampling locations, Depths, and Analyses:** Table 1-6 is presented as a summary of the data gap investigations presented in Section 5.0, but there are numerous inconsistencies between this table and the information provided in the text. Some examples include, but are not limited to:
- The text of Section 5.1.1.2 [Site 6 Groundwater Investigation (Data Gap 1), page 5-4] indicates that DPT groundwater samples will be analyzed for semivolatile organic compounds (SVOCs) and 1,4-dioxane, but Table 1-6 does not include this analysis.
 - The text of Section 5.1.2.1 [Site 7 Former Building 68-3 Soil Investigations (Data Gap 3), page 5-6] indicates that unsaturated and saturated soil samples will be analyzed for volatile organic compounds (VOCs), but this is missing from Table 1-6. In addition, the text states that groundwater samples will be analyzed for VOCs, natural attenuation parameters (NA) and microbial parameters, but Table 1-6 does not include these analyses.
 - The text of Section 5.1.4.3 [Site 16 Groundwater Investigation (Data Gap 9), page 5-13] states that saturated soil from new second water bearing zone (SWBZ) monitoring well boreholes will be analyzed for VOCs, SVOCs and 1,4-dioxane, metals, total organic carbon (TOC), grain size, bulk density, and microbial parameters, but these analyses are missing from Table 1-6.
 - The text of Section 5.2.1.1 [Site 9 Wash-Rack Soil Investigation (Data Gap 15)], states that groundwater samples will be analyzed for TPH Purgeable (TPHp), and TPH Extractable (TPHe) in addition to the analyses included in Table 1-6.

- The text of Section 5.2.1.2 [Site 9 Sewers Soil Investigation (Data Gap 16), page 5-16] indicates soil and groundwater samples will be analyzed for metals; however, this is not shown on Table 1-6. Also, the grain size analysis for saturated soil samples is missing from Table 1-6.
- The text in Section 5.2.2.2, [Site 13 - Incinerator Soil Investigation (Data Gap 20), page 5-21], indicates unsaturated soil samples will be analyzed for metals, but Table 1-6 (Site 13 - Incinerator Soil) does not include this analysis.
- The fifth paragraph in Section 5.2.4.2 [Site 22 - Groundwater Investigation (Data Gap 26), page 5-27] indicates soil and groundwater samples will be analyzed for VOCs (including MTBE), SVOCs (including 1,4-dioxane), TPH-purgeable, TPH-extractable, and metals, but Table 1-6 does not indicate soil sample analyses or hydropunch groundwater sample analyses for Data Gap 26.
- The last paragraph on page 5-28 of Section 5.2.5.2 [Site 23 - Groundwater Investigation (Supplemental Data Gap)] indicates samples will be analyzed for TPHe but this analysis is missing from Table 1-6.
- The third paragraph on page 5-29 of Section 5.2.5.2 [Site 23 - Groundwater Investigation (Supplemental Data Gap)], states that groundwater samples from existing monitoring wells will be analyzed total and dissolved metals, but Table 1-6 does not include total or dissolved metals analyses for existing monitoring wells.
- The text in Section 5.3.1.1 [Site 3 Building 112 Soil Investigation (Data Gap 28), page 5-30] states that hot spot soil samples will be analyzed for VOCs, SVOCs, TPHp, TPHe, metals, that saturated soil samples will be analyzed for VOCs, SVOCs, metals, TOC, grain size, bulk density, and microbial parameters, but Table 1-6 has no specified analytes. Similarly, the text states that groundwater samples will be analyzed for VOCs, SVOCs, metals, and NA and microbial parameters, but this information is also missing from Table 1-6. For completeness, all analytes should be specified in this Table; the "TBD" entry under number of samples is sufficient to indicate that these are optional samples.
- The text in Section 5.3.2.1 [Site 4 Building 163 Soil Investigation (Data Gap 30), page 5-33] indicates that saturated soil samples and groundwater will be analyzed for TPHp and TPHe in addition to the analytes listed in Table 1-6.
- The text in Section 5.3.2.3 [Site 4 Building 360 Soil Investigation (Data Gaps 31 and 33), page 5-36] states that groundwater from DPT locations

will be analyzed for total and dissolved metals, but Table 1-6 only specifies dissolved metals.

- The text in Section 5.3.4.4 [Site 21 Sewer Soil Investigation (Data Gap 41), page 5-42] includes SVOC analyses for groundwater samples in addition to the analytes listed in Table 1-6.
- The text in Section 5.3.5 [OU-2B Sitewide Groundwater (Data Gaps 29, 43, 44, 45), page 5-45] states that groundwater samples will be analyzed for both total and dissolved metals, but Table 1-6 does not include total metals.

Please resolve these discrepancies.

9. **Section 2.1, Facility History and Current Operations:** This section is missing the date Alameda Point was placed on the National Priorities List and the date the base closed. Please revise the text to include this information.
10. **Page 2-12, fifth bullet:** Please remove from the tarry refinery waste from being investigated under the TPH program and place it under the CERCLA investigations being performed at this site.
11. **Section 2.2.2.2, Site 13, Page 2-12 and Table 1-5, SWMU Site Sampling Locations, Depths, and Analyses:** The proposed sampling for area of concern (AOC) 009 presented in Table 1-5 [i.e. one initial boring at each of the five former above ground storage tank (AST) locations], implies that the tanks were 5,000 gallons or less in size, based on AST Sampling Methodology presented in Section 4.2.1 (pages 4-4 and 4-5), but the actual sizes of the former ASTs are not presented in the Site 13 description in Section 2.2.2.2. Please modify the text of Section 2.2.2.2 to include the sizes of the former ASTs, which were removed from the site in 1990. If the sizes of the former ASTs cannot be verified, please explain the rationale behind sampling as though each AST was less than or equal to 5,000 gallons or consider a more conservative approach (i.e. more borings per former AST location).

Additionally, the sixth bullet on page 2-12 indicates the contents of these 5 ASTs were unknown. Table 1-5 indicates soil and groundwater samples collected from AOC 009 will be analyzed for VOCs, SVOCs, TPHe, and TPHp, but not for pesticides, PCBs, and metals. The text indicates ASTs were associated with the Pacific Coast Oil Works refinery which operated from 1879 to 1903 and that they were not demolished until 1990. It is therefore possible that additional materials like pesticides and PCBs were stored in the ASTs in subsequent years. Please consider adding soil and groundwater analyses for pesticides, PCBs, and metals for AOC 009.

12. **Page 2-18, second bullet:** Investigation of lead in groundwater should be included in this bullet.

13. **Page 2-19, seventh bullet concerning OWS-372B:** There is no guarantee that soil and groundwater beneath this OWS are not contaminated, especially since activities in Building 372 were known to have used solvents, oil and lubricants. As specified in the final RI for this site, soil and groundwater beneath all OWS needs to be investigated. Please revise to include this OWS in the sampling.
14. **Page 2-20, end of bullet paragraph:** Please clarify how and when the extent of chromium and cyanide contamination in soil in the vicinity of the SPH treatment system will be investigated.
15. **Page 2-25, bullets:** Please include OWS-162 for investigation in this section. Building 162 has yielded high hits of VOCs in soil gas and potential sources must be investigated including OWS. There is not sufficient justification for excluding the soil and groundwater beneath this OWS from sampling.
16. **Table 3-1, Data Quality Objectives:** Table 3-1 appears to be incomplete. The DQOs presented in Table 3-1 provide a general overview of the seven-step planning approach to ensure the environmental data collected are suitable for their intended usage. While the text in Table 3-1 references additional information in the Sampling and Analysis Plan (SAP), Table 3-1 contains the entire discussion of DQOs in the text of this report and therefore should contain a comprehensive description of the seven-step approach. More specific information on samples to be collected, such as whether soil and groundwater will both be sampled, should be included in Step 3. Please revise Table 3-1 to specify whether soil, groundwater, or both will be sampled in Step 3.

In addition, Step 4 does not adequately address the vertical extent of the study boundary. For example, for the OWSs, it is unclear whether groundwater samples will be collected, and whether step-down soil sampling will be performed and to what depth. Step 4 for AST sites indicates initial samples will be collected at 1 foot below ground surface (ft bgs) from AST locations, with additional step-out sampling to be conducted if necessary. However, no protocols for sampling at depth (between 1 ft bgs and groundwater) are described in Table 3-1. Please revise the text of Table 3-1 to include more specific information regarding the nature and extent of sampling to be collected for the SWMU areas, including defining the vertical extent of contamination and protocols for sampling at depth.

17. **Table 3-1, Data Quality Objectives:** The text under Step 5 (page 1), states "If the COPC concentrations in initial soil samples are less than the screening criteria, then the OWSs have not leaked contaminants to the environment and no further action is required," but a contaminant may be present at a concentration above laboratory reporting limits but below screening criteria. This does not indicate the absence of a release, but could indicate no further action is required. Please revise this statement to read something like, "If the COPC concentrations in initial soil samples are less than the screening criteria, then no further action is

required." This language is repeated in Step 5 for UST/ASTs (page 2), GAPs (page 3), and WDs (page 5). Please also revise the text for each of these sections.

18. **Table 3-1, Data Quality Objectives:** It appears that the extent of contamination may not be fully delineated in some cases. Text under Step 5 states "Concentrations greater than the screening criteria in the third step-out sample may be related to native or fill (background conditions) and subsequently no further step-outs will be conducted." While some contaminants may exist at elevated background conditions at parts of the site, Section 1.0 states "at the completion of this scope of work, it is anticipated that no additional field activities will be required to complete the FS phase..." In order to minimize the possibility of additional investigations, we suggest that concentrations greater than screening criteria be compared to existing site background data and that additional step-out sampling be conducted, if necessary, to delineate contamination to the extent possible. Please discuss the criteria that will be used to determine whether elevated contaminant concentrations are representative of background or fill conditions and are not part of a larger contamination plume.
19. **Table 3-1, Data Quality Objectives, Pages 1-5 and Section 4.2.1, AST/UST Sampling Methodology, Page 4-4:** It appears that samples could be collected from clean fill. Text under Step 4 specifies where samples will be collected at former (removed) UST locations. For example, for removed 5,000 gallon to 20,000 gallon USTs, one sample will be collected near each end of the excavation. It is possible that former tank locations were backfilled with clean fill. Please explain the precautions that will be taken to avoid collecting samples from backfilled areas which may not be representative of residual contamination.

In addition, it is possible that collection of two samples, one from either end of the excavation (5,000 to 20,000 gallon removed and in-place USTs) may miss contamination if a leak occurred in another part of the UST. Please ensure that one of the sample locations is on the downgradient side of the UST and consider adding additional borings to the remaining sides of the excavation.
20. **Table 3-1, Data Quality Objectives, Page 3 of 10, and Section 4.2.1, AST/UST Sampling Methodology, Page 4-5:** The text and Table 3-1 state that sampling will be done in the center of above 20,000 gallon or greater ASTs, whether they are in place or not, but it is unclear how this can be done if the tank is circular. Please explain how sampling will be done for large ASTs that are still in place.
21. **Table 3-1, Data Quality Objectives, Page 9 of 10, Step 5:** It appears that some text may be missing from the last paragraph since the first sentence discusses conditions in the FWBZ, but the last sentence only specifies step-down sampling in the second water bearing zone (SWBZ). The approach to step-down sampling in the FWBZ should also be specified. Please revise this entry to include step-down sampling in the FWBZ.

22. **Table 3-1, Data Quality Objectives, Page 9:** Step 4 of the DQOs for the Groundwater Investigation states that the step-down process for delineating vertical contamination in groundwater will proceed to a maximum of 20 ft bgs. Why is the vertical delineation restricted to 20 ft bgs when groundwater contamination is present at depths of at least 60 ft in some places (e.g. Site 4)? Also, the objective of delineating the vertical extent of the groundwater plumes should take into account that many of the sites do not have a distinguishable first and second water bearing zone having no BSU present. Please revise this DQO to indicate the step-down sampling process will proceed to depths that vertically delineate the plumes to the MCL level.
23. **Table 3-2 Screening Criteria For Soil Samples, Page 9:** There appears to be a significant discrepancy in Table 3-2 between the Project Action Limit for Soil Samples and the EPA Region 9 Residential preliminary remediation goals (PRGs) on which they are based, according to the footnote, for select metals. The following table presents the metals in question, their Residential PRGs, and the Project Action Limit for Soil Samples as it appears in Table 3-2. Please explain or clarify the significant discrepancy between the two. If errors are found, please review the remainder of Table 3-2 for similar discrepancies.

Analyte	Residential PRG (mg/kg)	Project Action Level (mg/kg)
Arsenic	0.39	4.8
Mercury	23	1800
Molybdenum	390	23
Nickel	1600	390
Selenium	390	1600
Thallium	5.2	390
Vanadium	78	24.3

24. **Table 3-3, Screening Criteria for Water Samples:** It is unclear why the project quantitation limits (PQLs) for trichloroethene (TCE), tetrachloroethene (PCE) and cis-1,2-dichloroethene (cis-1,2-DCE) are 5 micrograms per liter (ug/L) when the PQLs for other volatile organic compounds (VOCs) are 0.5 or 1 ug/L. The analytical method detection limits (MDLs) are 0.2 ug/L, so it appears that a lower PQL could be specified. Please specify 0.5 or 1 ug/L as the PQL for TCE, PCE, and cis-1,2-DCE.

In addition, it is unclear why benzo(a)pyrene was omitted from the table. This semi-volatile organic compound (SVOC) should be included in both the

“SVOCs/8270C” and the “SVOCs/8270C (PAHs only)” analyte lists. Please add benzo(a)pyrene to Table 3-3.

Finally, the Project Action Limit for Water Samples column (column #4) contains a number of blank entries for specific pesticides. Please fill in these entries with the appropriate screening criteria or designation.

25. **Section 4.0, Solid Waste Management Unit Sampling Program and Rationale, Page 4-1:** Section 4 describes the sampling program and rationale for solid waste management units (SWMUs); however, it is generally unclear how many and what type (soil/groundwater) of samples will be collected from each sampling location throughout Section 4. It appears this information is presented elsewhere, in Table 1-5 (SWMU Site Sampling Locations, Depths, and Analyses) and Section 7.6 (Soil Sampling Step-Down Procedure and Step-Out Criteria), but additional information is needed in Section 4. Please revise the text to include a summary of the sampling to be performed.
26. **Section 4.1.1 OWS Sampling Methodology, Page 4-2 and Figure 4-2 OWS Sampling Methodology:** Figure 4-2 indicates that if the OWS is greater than or equal to 4 feet deep or access is restricted, then the sample will be collected adjacent to the OWS. The text of Section 4.1.1 states that if the OWS is greater than or equal to 4 feet deep or access is restricted, then (1) sampling will be accomplished at the inlet and outlet piping areas of the OWS and (2) the initial soil sample will be collected from just below the bedding for the OWS, but no deeper than one foot below the bottom of the OWS. The explanation in the text is unclear: will the sampling occur adjacent to the OWS or within the OWS? Please review and revise the text and/or Figure 4-2 for consistency.
27. **Section 4.1.1, OWS Sampling Methodology, Page 4-2, and Figure 4.2, OWS Sampling Methodology:** The text and Figure 4-2 do not clearly specify how sampling locations will be selected when sampling through the floor of the OWS is necessary. Specifically, there is an inconsistency in the flow chart (Figure 4-2) if a “No” decision is made at the first decision diamond. If there are no cracks and the OWS is not more than 4 feet deep and access is not restricted access, then the flow chart specifies that sampling is to take place through the floor at the location of the crack. This is inconsistent because the first “No” decision may have been made because there were no cracks. In addition, the decision tree does not address sampling at inlet or outlet piping locations. Please resolve the discrepancy that results if no cracks are identified and include the potential for sampling at inlet and/or outlet piping locations.
28. **Section 4.2.1 AST/UST Sampling Methodology, Page 4-4 and 4-5 and Figure 4-3 AST/UST Sampling Methodology:** Figure 4-3 states that a sample will be collected at 6-inches bgs if visible contamination is observed, but this is not discussed in the text. Please revise the text to include sampling of visibly contaminated soil.

29. **Section 4.2.2, AST/UST Sampling Methodology, Page 4-4:** In the first set of bullet points on this page, it is unclear how the depth maxima for each of the different sized underground storage tanks (UST's) will be specified to ensure that soil that was beneath the UST/AST is sampled rather than clean fill. This is of particular concern for removed USTs because a UST of the smallest dimension could potentially be buried to a depth greater than 5 feet. Please specify how sampling will be conducted to ensure that clean fill is not sampled.
30. **Section 4.2.1, AST/UST Sampling Methodology, Page 4-5:** The text in this section does not include a description of the analyses to be performed and instead references Table 3-1, Data Quality Objectives, but review of Table 3-1 indicates analytical information is not presented. The text in parallel sections 4.1.1 (OWS Sampling Methodology), 4.3.1 (GAP Sampling Methodology), and 4.4.1 (Wash Down Areas Sampling Methodology) describes the analyses to be performed on samples. Please include a description of soil and groundwater analyses to be performed in Section 4.2.1 and remove the reference to Table 3-1.
31. **Section 4.3, Generator Accumulation Points (GAPs) and Section 4.4, Wash Down Areas:** In cases where gravel was used as bedding material and the gravel is more than 1 foot thick, it may not be appropriate to limit the sampling depth to less than 1 foot below the concrete or asphalt flooring as is done in each of the bullets on page 4-6 and in the last paragraph of page 4-7. It is difficult to get enough fine-grained material for analysis if a sample consists only of gravel. Please revise the text to specify that if gravel bedding more than 1 foot thick is found beneath flooring, the first sample will be collected from the soil surface beneath the gravel.
32. **Section 4.3.1, GAP Sampling Methodology, Page 4-6:** The second and third bullets in Section 4.3.1 indicate additional sample locations will be collected randomly. Please specify how these random locations will be selected.
33. **Section 4.4.2 Wash Down Areas Sampling Methodology, Page 4-7 and Table 3-1, Data Quality Objectives, Page 5:** The text and Step 4 of Table 3-1 state that a third step-out sample will not be performed due to sample coverage based on 50-foot grids. However, step-out sampling may be required in the outer/perimeter grids, where there are no outlying samples. If contamination indicates that delineation outside the boundaries of these wash down areas is needed, a third step-out sample will be necessary, particularly if attempting to delineate the horizontal extent of groundwater contamination. Please revise the text to state that third step-out samples may be necessary if contamination is found along the perimeter grid squares.

In addition, this approach is inconsistent with the approach discussed in Section 5.3 of the SAP. The SAP states that each set of step-out samples will be 5 feet

from the previous set of samples. Please reconcile the procedures for step-out sampling in the Work Plan and SAP.

34. **Figure 4-1, Solid Waste Management Unit Location Map and Figure 5-1, Proposed Data Gap Soil and Groundwater Investigation Locations:** Neither of these figures include the grid sampling that will be done in WD-40 and WD-41A at Site 6 or at WD-114 at Site 8. In addition, samples that will be collected at Building 265 are missing from Figure 5-1. Please revise Figure 5-1 to include all sampling locations, including the WD grid sampling at Sites 6 and 8 and the Building 265 Samples. In addition, please review the text and tables to ensure that all of the soil samples and monitoring wells proposed in the Work Plan are included on Figure 5-1 and on the other Section 5 figures.
35. **Section 5.0, Soil and Groundwater Plume Delineation Sampling and Rationale, Page 5-2:** The last paragraph on this page indicates that a plume will be considered well defined if Chemicals of Potential Concern (COPCs) are found to be equal to or less than two times the screening criteria for the horizontal extent and 20 times the screening criteria for vertical extent, but this may be an erroneous assumption. A plume may have a large horizontal and/or vertical extent at a concentration that is only slightly above the screening criteria. The extent of this contamination would be missed under the proposed approach. For example, the screening criteria for TCE in groundwater specified in Table 3-3 is 5.0 ug/L. This approach would result in not delineating TCE below 10 ug/L horizontally or 100 ug/L vertically. Screening criteria for COPCs should be set at no higher than the maximum contaminant level (MCL) or the Preliminary Remediation Goals (PRGs) in order to consider the extent of a groundwater plume to be well-delineated. Please propose revised and lower assessment criteria for the delineation of a contaminant plume.
36. **Section 5.0, Soil and Groundwater Plume Delineation Sampling and Rationale:** The text in the site-specific subsections does not always specify sampling depths. Sampling depths are described in Section 7.6.1, Step-Down Procedure, and are listed in Table. For example, initial sampling depths for Site 9, Metals Soil Investigation (Data Gap 18) are specified (at 1 ft bgs) on Page 5-16 (section 5.2.1.3). However, in the next section 5.2.1.4, Site 9 Groundwater Investigation (Data Gaps 11, 12, 13, 14, and 17), initial sampling depths are not specified. Due to the large number of samples to be collected, please ensure that the text contains a complete summary of field procedures. Summary tables, such as Table 1-6, should serve as a summary of the text, rather than introducing new information. Please ensure that the tables and text contain consistent information.
37. **Section 5.0, Soil and Groundwater Plume Delineation Sampling and Rationale, Page 5-2:** The first sentence of the last paragraph on Page 5-2 states "Step-out/step-down procedures will be initiated when COPC are detected at two times and 20 times the screening criteria." This is initially confusing as it appears to contradict previous step-out procedures (in Table 3-1 and elsewhere) for soil

sampling which require simply concentrations that exceed screening criteria. It is later clarified in this paragraph that this two times factor only applies to lateral groundwater plume delineation; however, it is unclear why groundwater plume boundaries are considered defined if the outermost samples still contain concentrations twice the screening criteria. This indicates that the extent of contamination has not been bounded. Similarly, the rationale behind the 20-times screening factor for step-down groundwater sampling is not described. Additional information regarding how these numbers were selected and how they will be used is necessary to evaluate their applicability. This appears to be acknowledged in the second sentence on page 5-2, which reads, "This will also likely be a negotiation point with the agencies." It is therefore unclear why this additional information was not included, if this was anticipated to be a point of discussion. Please clarify why the step-out procedure for soil characterization is initiated when concentrations exceed screening criteria, but groundwater concentrations must exceed twice the screening criteria in order to initiate step-out sampling.

Finally, Page 5-3 states that the step-out/step-down procedures are discussed in detail in Section 7.0. A review of Section 7.0 indicates that step-out/step-down procedures for soil sampling are discussed, as well as step-down procedures for groundwater. However, there appears to be no mention of step-out groundwater sampling using the two times screening criteria system in Section 7.0. Please resolve this discrepancy.

38. **Section 5.1, OU-1 Data Gap Investigations:** The text, figures, and tables do not consistently present the data gaps investigation. For example, Table 3-1 and Section 4 indicate that sampling will be done to investigate the WD areas, but this is not discussed in Section 5.1 and the grids and sampling locations are not depicted on any of the Section 5 figures. Similarly, sampling will be done at the OWS locations, but this is not included in the text or on the Section 5 figures; OWS sampling locations in respect should be depicted so that proposed locations can be reviewed. Please revise the text to present the full scope of the data gaps investigation at OU-1 sites and provide the WD grids and OWS sampling locations on Section 5 figures.
39. **Section 5.1.1.1, Site 6 Soil Investigation, Page 5-3 and Section 5.1.3.1 Site 8-Soil Investigation, Page 5-8:** The text in these sections states that no further soil investigations are required, but soil will be sampled to evaluate data gaps at the OWS and WD areas, so it is premature to conclude that soil is fully characterized. Please revise the text to indicate that soil sampling is being conducted to address data gaps at Sites 6 and 8.
40. **Section 5.1.1.2, Site 6 Groundwater Investigation (Data Gap1), Page 5-3, and Figure 5-3, OU1, Site 6 Proposed Soil and Groundwater Investigation Locations:** It is unclear why the text refers to 6 existing monitoring wells at Site

6 when Figures 5-3 and 1-6 depict 7 existing wells in Site 6. Please resolve this discrepancy.

41. **Section 5.1.1.2, Site 6 Groundwater Investigation (Data Gap1), Page 5-4 and Section 5.1.4.3, Site 16 Ground water Investigation (Data Gap 9), Pages 5-13 and 5-14:** It is understood that professional judgment may necessitate a change in location of a monitoring well, however criteria that will be used to evaluate changes in the proposed well locations should be specified. These criteria should be established using the DQO process. Also, if a well location is significantly different from the tentative location then the regulatory agencies should be notified with an amended figure for onboard review; a email with an Adobe Acrobat (pdf) copy of a hand marked copy of the figure and relevant sampling results would suffice. Please use the DQO process to develop criteria for adjusting the location of monitoring wells and revise the Work Plan to include this information. In addition, please consider providing the regulatory agencies with a chance to review any significant changes from the proposed monitoring well locations.
42. **Section 5.1.2.1, Site 7 Former Building 68-3 Soil Investigation (Data Gap 3), Page 5-6:** The second sentence in the second paragraph on this page indicates that samples will be collected at the "hot spots" as shown on the relative color output from the GORE™ Screening, but there is no specific information on the meaning of a hot spot. Please provide an unambiguous definition of "hot spot" in the text.
43. **Page 5-6 and 5-6, Site 7 Soil Debris Area:** Please specify whether soil samples are going to be taken beneath Building 459. It is not know whether the soil contamination extends northward under the building and this data gap needs to be filled.
44. **Section 5.1.2.3, Site 7, Groundwater Investigation (Data Gap 7) Page 5-7:** The text indicates that 13 monitoring wells were installed and sampled, however the figure indicates that there are 14 monitoring wells within the Site 7 boundary four additional wells beyond the Site 7 boundaries. Please resolve this inconsistency.
45. **Section 5.1.2.3, Site 7, Groundwater Investigation (Data Gap 7) Page 5-8:** The second paragraph on page 5-8 indicates that no new wells are proposed for the FWBZ or the SWBZ and that some monitoring wells may be installed. based on professional judgment, but there are no criteria to guide these decisions. The DQO process should be used to develop criteria to be used to evaluate whether monitoring wells should be installed. Please note, as mentioned in previous comments, that in many locations there is no distinction between the FWBZ and the SWBZ, and that there is no BSU present. Please use the DQO process to develop criteria for the installation of monitoring wells and revise the Work Plan to include this information.

46. **Section 5.1.3.2, Site 8-Groundwater Investigation (Data Gap 7) Page 5-9:** Similarly, the text in this section indicates that new monitoring wells may be installed in the FWBZ or SWBZ based on results of direct push technology (DPT) soil and groundwater sampling, but criteria for these decisions have not been provided. Please use the DQO process to develop criteria for the installation of monitoring wells and revise the Work Plan to include this information.
47. **Section 5.1.4.3, Site 16 Groundwater Investigation (Data Gap 9), Page 5-13:** It is unclear why PCB analysis has not been specified for soil samples. Please revise the Work Plan to include PCB analysis of all samples collected from above the water table at Site 16.
48. **Section 5.2.1.2 Site 9 - Sewers Soil Investigation (Data Gap 16), Page 5-16:** The text in the second paragraph states that samples will not be collected if the water table is not encountered above the base of the backfill, but contamination could also be found in unsaturated soil if the water table is found lower than expected. Please consider collecting and analyzing unsaturated soil samples if saturated soil or groundwater samples cannot be collected.
49. **Section 5.2.1.2 Site 9 - Sewers Soil Investigation (Data Gap 16), Page 5-16:** The last sentence of the third paragraph on page 5-16 states that additional samples along the drain or sewer may be collected at upstream locations if initial soil samples contain COPC concentrations greater than screening criteria, but there are no guidelines or criteria for selecting additional locations. For example, based on the isoconcentrations depicted in Figure 5-14, an additional sampling point may be warranted in the southernmost section of storm sewer line in Site 9, near where the sewer line exits Building 410, but it is unclear how the location would be selected. Please use the DQO process and provide guidelines for selecting these additional sampling points.
50. **Section 5.2.1.4 Site 9 - Groundwater Investigation (Data Gaps 11, 12, 13, 14, and 17), Pages 5-17 and 5-18:** The last paragraph on Page 5-17, continued on page 5-18, states that step-out/step-down sampling will be conducted if groundwater samples contain contaminant concentrations exceeding 2 times and 20 times the screening criteria, respectively, but it is unclear if step-out/step-down soil sampling will also be required, as soil samples from the borings will be analyzed as well. Please clarify whether step-out/step-down sampling will be conducted based on soil sampling results.
51. **Section 5.2, OU-2A Data Gap Investigation, Page 5-14 and Table 1-6 Data Gap Sampling Locations, Depths, and Analyses:** In Section 5.2, the installation of FWBZ or SWBZ monitoring wells is proposed following results from DPT/hydropunch investigations. In some cases, the proposed monitoring well locations are not co-located with DPT/hydropunch sampling locations, yet soil sampling is not proposed during monitoring well installation. Table 1-6 indicates that soil samples will not be collected from the 10 FWBZ groundwater

monitoring wells to be installed for Groundwater Investigations for Site 13, Site 19, and Site 22. Some of the proposed locations for these wells appear to be located near previous sampling locations; therefore, additional soil sampling in these locations may be redundant. However, some of the proposed locations, such as those in Site 9 within or immediately west of Building 410, are not near previous sampling locations. Please consider the collection and analysis of soil samples during FWBZ groundwater monitoring well installation, particularly if staining is noted or when the new wells will not be near previous sampling locations.

52. **Section 5.2.2.1 Site 13 - Lead Soil Investigation (Data Gap 19), Page 5-19:** The last sentence of the first paragraph of Section 5.2.2.1 states, "Further characterization is required in the area of borings 028-S13-001, 028-S13-002, IMF-06, 028-S13-007, B13-30, B13-31, B13-32, and B13-41" and that these locations are presented on Figure 5-18, but borings 028-S13-001, 028-S13-002, IMF-06, and 028-S13-007 are not labeled on Figure 5-18. Please include the locations of these borings on Figure 5-18.
53. **Section 5.2.2.1 Site 13 - Lead Soil Investigation (Data Gap 19), Page 5-19:** Figure 6-14 in the OU-2A Remedial Investigation Report indicates boring B13-29 contained a lead concentration of 378 mg/kg, which exceeds the California modified residential PRG for lead. Additional sampling to delineate lead contamination to the south and east of boring B13-29 should be done, since the closest borings to the east lie approximately 240 feet away. Please include additional sampling around boring B13-29 as a part of Data Gap 19.
54. **Section 5.2.2.2 Site 13 - Incinerator Soil Investigation (Data Gap 20), Page 5-20:** The text states that a third step-out sample will not be performed due to sample coverage based on 60-foot square grids. However, step-out sampling may be required in the outer/perimeter grids, where there are no additional samples intended. In this case, if contamination requires delineation outside the 5 by 7 grid boundaries, a third step-out sample may be required if attempting to delineate the horizontal extent of contamination.
55. **Section 5.2.2.3 Site 13 - Groundwater Investigation (Data Gap 21), Pages 5-21 and 5-22:** One FWBZ monitoring well is proposed southeast of the benzene plume; however, no explanation as to the rationale behind this location is given. The text also states that additional FWBZ monitoring wells may be installed based on the soil and groundwater sampling results, but there are no criteria to guide this decision. Please provide additional details on why this location was selected for a FWBZ monitoring well and criteria for relocating this well and for the installation of additional FWBZ monitoring wells.
56. **Section 5.2.2.3 Site 13 - Groundwater Investigation (Data Gap 21), Pages 5-21 and 5-22:** It is unclear why the text in the first paragraph of Section 5.2.2.3 states "There appears to be minimal, if any, impact on the SWBZ groundwater"

since, according to the OU-2A RI, the SWBZ has only been sampled in the eastern portion of Site 13 at five locations. Based on the information presented in Table 5-1, one SWBZ monitoring well exists cross gradient of the contaminant plumes. Additional investigation of the SWBZ, particularly in the plume areas, does not appear to have been conducted; therefore, the conclusion that there is minimal impact to SWBZ groundwater is premature. Please consider including SWBZ sampling at Site 13 or provide additional justification for the quoted statement.

57. **Section 5.2.3.1 Site 19 - Yard D-13 Soil Investigation (Data Gap 223), Page 5-22:** The text states that a third step-out sample will not be performed due to sample coverage based on 25-foot by 35-foot grids. However, step-out sampling may be required in the outer/perimeter grids, where there are no additional samples intended. In this case, if contamination requires delineation outside the grid boundaries, a third step-out sample may be required, particularly if attempting to delineate the horizontal extent of contamination.

Additionally, the first complete paragraph on Page 5-23 indicates samples associated with Yard D-13 will be analyzed for VOCs only. Section 5.2.3.2 indicates soil and groundwater samples associated with Data Gap 22 for Site 19 will be analyzed for VOCs, SVOCs (including 1,2-dioxane), TPH-purgeable, TPH-extractable, and metals. The activities associated with Yard D-13 were identified as a potential source for groundwater contamination. Therefore, it seems appropriate that sampling activities associated with defining contamination in the possible source area (the Yard D-13) be analyzed for the same suite of analytes as the soil and groundwater samples for the remaining part of the Site. Please include VOCs, SVOCs (including 1,2-dioxane), TPHp, TPHe, and metals analysis for the Yard D-13 soil investigation (Data Gap 23).

58. **Section 5.2.4 Site 22 Data Gap Investigation, Page 5-25:** The second paragraph in Section 5.2.4 states that the two data gaps within Site 22 are lead in soil and groundwater, but additional detail provided in Sections 5.2.4.1 and 5.2.4.2 indicates the data gaps include more analytes than lead. The data gaps are listed as lead and arsenic in soil, and additional investigation of soil and groundwater for VOCs, SVOCs, TPHp, TPHe, and metals. Please revise the text of Section 5.2.4 to clarify that lead is not the only analyte of concern for the Site 22 data gaps.
59. **Section 5.2.4.1 Site 22 - Lead Soil Investigation (Data Gap 25), Page 5-25 and Figure 5-23, OU-2A, Site 22 (Data Gap 25) Proposed Soil Sampling Locations:** The first paragraph of Section 5.2.4.1 identifies the following three locations where lead concentrations exceeded screening criteria: "in the southwestern area of Site 22 at boring MW-547-5 and near the former gasoline station fuel lines at borings 547-6 and 547-11." A review of Figure 5-23 shows that boring MW-547-5 is located in the southeastern portion of the site; this location appears to have been confused with 547-5. According to information

presented in the OU-2A Remedial Investigation Report, the sample collected from 0.5-1 ft bgs from boring MW-547-5 contained a concentration of 9890 mg/kg. Further review of the OU-2A indicates sampling locations 547-6 and 547-11 contained lead concentrations exceeding the screening criteria at 2 ft bgs, but that sampling location 547-5 contained a lead concentration of 18 mg/kg. Based on this information, please revise the text of Section 5.2.4.1 to indicate boring MW-547-5 is located in the southeastern area of Site 22. Additionally, please revise Figure 5-23 to include proposed sampling locations in the vicinity of boring MW-547-5 rather than previous sampling location 547-5.

60. **Section 5.2.4.1 Site 22 - Lead Soil Investigation (Data Gap 25), Page 5-26:** The proposed sampling scheme is to collect samples from 0.5-1 ft bgs and at 5 ft bgs, but since lead tends to have a limited mobility in soil, smaller sampling intervals may be warranted, such as sampling at 0.5 ft bgs, 2 ft bgs, and 5 ft bgs. The text indicates that soil samples collected from 2 ft bgs at locations 547-11 and 547-6 exceeded screening criteria for lead. The OU-2A RI Report indicated these locations were collected after the removal of fuel lines, from the bottom of the excavation areas. Sampling at 5 ft bgs may help to delineate the vertical extent of contamination, but when attempting to delineate the horizontal extent of contamination previously discovered at 2 ft bgs, similar depths should be sampled. Please consider including an additional sample at approximately 2 ft bgs to provide consistency with previous sampling results. Additionally, please discuss measures that will be undertaken to ensure that sampling is not conducted in areas that may contain clean fill and thus may not be representative of residual metals contamination.
61. **Section 5.2.4.1 Site 22 - Lead Soil Investigation (Data Gap 25), Pages 5-25 and 5-26:** Table 1-6, as well as the first bullet in section 5.2.4.1 (Page 5-25) indicate samples will be collected from approximately 11 locations for Data Gap 25, but the following three paragraphs (pages 5-25 and 5-26) describe 9 sample locations. Figure 5-23 displays 12 proposed sampling locations. Please resolve these discrepancies.
62. **Section 5.2.4.2 Site 22 - Groundwater Investigation (Data Gap 26) Page 5-26:** The last sentence of the first paragraph in Section 5.2.4.2 states "There appears to be minimal, if any, impact on the SWBZ groundwater", but only one SWBZ monitoring well is present at Site 22, and it is located cross gradient of the contamination plume. Please provide additional information supporting the conclusion that there is minimal, if any, impact on SWBZ groundwater. If such information can not be provided, please include SWBZ sampling as part of the Data Gap 26 groundwater investigation.
63. **Section 5.3.1.1 Site 3 – Building 112 Soil Investigation (Data Gap 28), Pages 5-30 and 5-31:** The soil sampling methodology for Building 112 may not adequately characterize possible releases from the former zinc smelter. According to the last full paragraph on page 5-30 and the second full paragraph

on page 5-31, no soil sampling will be conducted if results of the GORE Module survey do not identify hot spots, but zinc cannot be detected in soil gas and the former location of the zinc smelter cannot be identified by field personnel. Please use a grid based sampling method to evaluate whether there is zinc contamination in soil or explain why this will not be done.

64. **Page 5-35, last two paragraphs:** How will the vertical extent of the DNAPL and VOC plume be defined in the area of Plume 4-2? The SPH treatment system is treating to a depth of around 45 – 50 feet bgs and there is no way to know if the DNAPL has sunk lower than that depth. Please clarify how post-treatment sampling will answer this concern. Of general concern is that the full vertical and lateral extent of the plumes at OU 2B be defined to the MCL boundary in order to effectively design a remedial system.
65. **Section 5.3.2.3, Site 4- Building 360 Soil Investigation (Data Gaps 31 and 33), Page 5-36:** Although the text states that soil samples will not be collected in Building 360, US EPA identified several data gaps involving the extent of metals contamination beneath Building 360. Six-phase heating will not address metals contamination, so samples need to be collected. Please explain how and when data gaps associated with the extent of metals contamination beneath Building 360 will be addressed so that the objective that future investigation will not be required after this data gaps investigation is completed can be met.
66. **Section 5.3.3.3 Site 11 – Building 265 Soil Investigation (Data Gap 36), Page 5-38 and 5-39:** Possible releases of TPH and VOCs may not be adequately characterized by the proposed soil sampling methodology. Soil sampling is proposed for shallow soils (0.5-1 ft bgs); however, possible continuing sources of VOCs and TPH present below 1.0 ft bgs may not be detected if VOCs in shallow soil have volatilized. Please consider collection of additional samples below 1 ft bgs.

In addition, it is unclear why these sample locations are not shown on any of the Section 5 figures. Please include the Building 265 sampling on a Section 5 figure.

67. **Section 5.3.5, OU-2B Site-Wide Groundwater (Data Gaps 29, 43, 44, 45), Page 5-44:** It is unclear if a conductor casing or double casing will be used to minimize the potential for contaminant migration from the FWBZ to the SWBZ during drilling and afterwards. Please provide procedures to minimize the potential for contamination of the SWBZ.

In addition, this figure does not include the 5 new wells installed in Site 11 near the Seaplane Lagoon. Please review the location and depth of these new wells and evaluate whether the two wells proposed near the Seaplane Lagoon are still necessary.

68. **Page 5-44:** Please clarify the discussion here regarding the FWBZ, the SWBZ and the BSU. For Sites 9, 13, 16, 19, 22, 23 and most of Site 4 the BSU is not present and there is no differentiation between the FWBZ and SWBZ. Most of these sites have groundwater contamination which needs fuller vertical and lateral delineation. The proposed method of installing wells in the “FWBZ” and the “SWBZ” and down to the BSU does not really make sense for these sites. Please revise while also keeping in mind that part of the reason for further investigation of the groundwater in these areas is to delineate the plumes to MCLs both laterally and vertically. Please also keep this comment in mind as it relates to Sections 7.8 through 7.12.
69. **Figure 5-39, OU-2B Site-Wide (Data Gaps 29, 43, 44 and 45) Proposed Soil and Groundwater Investigation - FWBZ:** The legend indicates that the green symbols represent the location of proposed SWBZ wells, but the figure title and text in Section 5.3.5 indicate that this figure depicts FWBZ wells. Please resolve this discrepancy.
70. **Section 7.5, Hand Auger and DPT Sampling, Page 7-4 and Section 7.10, FWBZ/SWBZ Continuous Coring Soil and Groundwater Sampling, Page 7-13:** It is unclear how VOCs will be preserved since the core will be cut open, screened for VOCs, and logged before samples are collected. The text states that this VOC screening requires a minimum of 5 minutes, with additional time for setup. During this period, VOCs will likely be lost, so it is recommended samples for VOC analysis be collected before the core is logged and that only minimal screening with a photoionization detector (PID) be done before VOC sample collection. Please revise the text to specify collection of samples for VOC analysis as soon as possible after the core bag is cut open or the core is cut..
71. **Section 7.6.1. Step Down Procedure, Page 7-5:** The vertical step down distance of 3 to 5 feet is probably too large for OU-1 sites, where the depth to groundwater is 3.5 to 5 feet. At OU-1, the step down distance should be 2 feet, if 2 to 3 samples are needed above the water table. Please revise the text to specify a 2 foot (or less) step down distance for OU-1 sites.

The timing of step down samples is also unclear, since it is not apparent whether deeper samples will be collected at the same time from the same boring and placed on hold at the laboratory pending analytical results of the initial sample or whether new borings will be done for step-down samples. If samples are all collected at the same time from the same boring and placed on hold at the analytical laboratory, will they be analyzed in order of increasing depth? What factors will guide this decision making process? Please revise the Work Plan to include this information. Please also consider any potential holding time or chain of custody constraints.

The step-down sampling methodology does not clearly indicate whether a groundwater sample will be automatically collected, or whether groundwater will

not be sampled in a particular location unless contain concentrations are met. Please revise the sampling scheme to include analysis of groundwater samples at each step-down sampling location regardless of soil contaminant concentrations.

72. **Section 7.6.2, Step-out Criterion, Page 7-5 and 7-6 and Figure 7-1, Step-out./Step Down Sampling Methodology:** The direction(s) for the first and subsequent step-out sample locations is(are) unclear. For example, if a step-out is needed, will step-out samples be done along the grid alignment or at a 45 degree angle to the grid? Figure 7-1 does not specify how the step-out sample locations will be determined. It is also unclear whether unsaturated and saturated soil samples and groundwater samples will be collected at each step-out location. For example, it is unclear for the case where only the 5 ft bgs sample exceeds screening criteria, whether only the 5 ft bgs samples from the step-out locations will be analyzed. A protocol should be developed to identify the next logical location for each step-out sample and the samples to be collected from each additional boring. Please use the DQO process to identify a protocol for determining the direction and number of step-out samples and revise the text to include this information. Please also clarify whether samples from all depths will be analyzed if only deeper samples are found to exceed screening criteria.

Additionally, please indicate why a maximum of three step-out borings was selected. If the true intent of this sampling plan is to have completed the necessary field activities to support FS phase and/or remedial design, then it is possible that additional step-out borings may be required to delineate the extent of contamination. Please justify or revise the three step-out maximum.

73. **Section 7.8.1, SWBZ Step-Down Procedures, Page 7-10:** The last paragraph of Section 7.8.1 indicates precautions will be taken to prevent cross contamination between the FWBZ and the SWBZ if groundwater COPC concentrations are 200 times the respective screening criteria at the base of the FWBZ. Minimizing the possibility of cross contamination between aquifers is extremely important. Please provide rationale behind using this 200 times the screening criteria factor, including why a smaller factor was not selected.
74. **Section 7.12, SWBZ Groundwater Monitoring Well Installation, Page 7-16:** The use of centralizers every 10 to 15 feet should be specified for SWBZ wells. Please revise the text to specify the use of centralizers as SWBZ wells are constructed.

MINOR COMMENTS

1. **Section 5.1.2.2, Site 7 Soil Debris Area Soil Investigation (Data Gap 4), Page 5-6, and Section 5.1.2.3, Site 7 Ground Water Investigation, Page 5-7:** The use of the word approximately to describe the number of soil and groundwater and soil samples seems inappropriate. The Work Plan should be more specific; for example, the text could be revised to indicate that "a minimum of" 17 samples

will be collected in the Soil Debris Area. Please revise the text to specify the minimum number of samples that will be collected.

Appendix A, Draft Sampling and Analysis Plan for OU-1, OU-2A, and OU2-B Data Gap Sampling, Alameda Point, Alameda, California, November 10, 2006

GENERAL COMMENTS

1. Many of the specific comments on the Work Plan also apply to the SAP. For example, the SAP does not include criteria for deciding when additional monitoring wells will be installed. Also, comments on the DQOs table, Table 1-3 of the Work Plan, should be applied to Table A.3-1 in the SAP. Similarly, Section 5 of the SAP appears to correspond to Sections 4, 5 and 7 of the Work Plan, so comments on those sections should also be applied to the SAP. When changes are made to the Work Plan, please also revise the corresponding sections, tables, and figures of the SAP.
2. The step-down/step-out criteria discussed in Section 5.3 are more clear and detailed than those presented in the Work Plan, except that the Work Plan states that the step-out samples be 10 feet or less from the initial sample and the SAP specifies a 5 foot distance. Please reconcile the discrepancies between the SAP and the Work Plan and consider revising the text in the Work Plan (Section 7.6) with the step-down/step-out criteria discussed in Section 5.3 of the SAP.
3. Sample depths are specified in Tables A.5-1 and A.5-2, but no rationale is provided and the sampling depths are not discussed in the text. At a minimum, the rationale for sampling depths should be discussed in the text. Please provide the rationale for the sampling depths in the text or on these tables.

SPECIFIC COMMENTS

1. **Section 4.1.2, Field Forms, Page A.4-2 and Attachment 1:** The text indicates that an example of the boring log form is included in Attachment 1, but this form is missing from the attachment. Please include this form in the final SAP.
2. **Section 5.2.8, OU-1, Site 16- Groundwater Investigation (Data Gap 9), Page A.5-17:** The first sentence of the last paragraph on page A.5-17 states that soil and groundwater samples will be collected at 11 locations as shown on Figure 5-12. The corresponding text in the Work Plan (Section 5.1.4.3, Page 5-13) states that soil and groundwater samples will be collected at 7 locations as shown on Figure 5-12. Please resolve this discrepancy.
3. **Section 5.2.19, OU-2A, Site 22- Groundwater Investigation (Data Gap 26), Page A.5-33:** The first sentence of the second paragraph of Section 5.2.19 on page A.5-33 states that soil and groundwater samples will be collected at three locations as shown on Figure 5-25. The corresponding text in the Work Plan

(Section 5.2.4.2, Page 5-27) states that soil and groundwater samples will be collected at four locations as shown on Figure 5-25. Please resolve this discrepancy.

4. **Section 5.2.20, OU-2A, Site 23- Groundwater Investigation (Supplemental Data Gap), Page A.5-36:** The first sentence of the first paragraph on page A.5-36 states that soil and groundwater samples will be collected at 17 locations as shown on Figure 5-27. The corresponding text in the Work Plan (Section 5.2.5.2, Page 5-28) states that soil and groundwater samples will be collected at 13 locations as shown on Figure 5-27. Please resolve this discrepancy.
5. **Section 5.2.24, OU-2B, Site 4- Building 360 Soil Investigation (Data Gaps 31 and 33), Page A.5-44:** The first sentence of the second complete paragraph on page A.5-44 states that two borings will be placed about 5 feet from 143-SS-004. The corresponding text in the Work Plan (Section 5.3.2.3, Page 5-36) states that three borings will be placed about 5 feet from 143-SS-004. Please resolve this discrepancy.
6. **Section 5.2.31, OU-2B, Site 21- Sewer Soil Investigation (Data Gap 41), Page A.5-50:** The first sentence of the second paragraph in Section 5.2.3.1 on page A.5-50 references Figure 5-34. The corresponding text in the Work Plan (Section 5.3.4.4, Page 5-43) references Figure 5-37. Please resolve this discrepancy.
7. **Section 5.3 Step-Down/Step-Out Criteria, Page A.5-53:** The first paragraph of Section 5.3 references Figure A.5-3; however, this figure is not included in the SAP. Please include Figure A.5-3 in the final version of the SAP.
8. **Section 5.3, Step-Down/Step-Out Criteria, Pages A.5-53 and A.5-54:** There is a discrepancy in the step-out distances specified in the “Step-Out Criteria” paragraph on page A.5-53 and the text of the fourth and sixth bullets on page A.5-54. The sixth sentence of the paragraph indicates that the distance to the second (and third) step-out samples will be 5 feet from the previous step-out sample, but the text of the fourth bullet states that the second step-out sample “will be at a distance selected by the field geologist.” Similarly, the text of the sixth bullet indicates that the distance to the third step-out sample will be selected by the field geologist. Please resolve these discrepancies.

In addition, the fifth bullet indicates that a step-in sample will be collected if samples from the second step-out sample do not exceed screening criteria, but collection of step-in samples does not appear to be discussed in the Work Plan or elsewhere in the SAP. Please clarify whether step-in samples will be collected and revise the text of the SAP and Work Plan to be consistent.

9. **Section 5.3, Step-Down/Step-Out Criteria, Page A.5-54:** The assumption in the text of the last bullet on Page A.5-54 is not valid for organic chemicals (e.g., VOCs, SVOCs, TPH, pesticides, and PCBs) and may not be valid for metals that

were used in Alameda Point operations. The text states that if “concentrations on the third step-out are still greater than the appropriate screening criteria, no additional step-outs will be accomplished” and “it will be assumed that the contamination did not originate from a spill or leak.” In this case, the contamination will be assumed to be related to background conditions. This assumption is not valid as it does not take into account the potential for widespread contamination, nor is it chemical-specific. For example, elevated metals concentrations may be related to fill material, site operations, or may be naturally occurring, but this is not the case with all COPCs. Additionally, regardless of their origin, contaminants detected above screening criteria may pose health risks. The data gap investigation should not be discontinued because attempts to bound it were unsuccessful. Additional step-out/step-down sampling may be warranted in these situations. Please remove the three step-out limit.

10. **Section 6.3.3, Grab Soil and Groundwater Sampling Procedures, Page A.6-5:** The air knife vacuum extraction system is proposed for advancement of borings for storm drain and sewer site sampling, but it is unclear if this would affect VOC concentrations in soil. Please discuss the potential of the pressurized air/vacuum to affect contaminant concentrations, particularly VOCs, in the subsurface and in samples to be collected.
11. **Section 6.3.3, Grab Soil and Groundwater Sampling Procedures, Page A.6-5 and A.6-6 and Section 6.3.4, DPT and HydroPunch Sampling Procedures, Page A.6-110 and Section 6.3.8, Waste Characterization Sampling Procedures, Page A.6-20:** Text in Step 5 (Section 6.3.3) and Step 3 (Sections 6.3.4 and 6.3.7) in the list of soil sampling procedures indicates soil will be placed into designated containers. Step 6 (Step 4 in Sections 6.3.4 and 6.3.7) then states that for each VOC analysis, three En Core samplers will immediately be collected from the sample container. To minimize volatilization of these compounds, it is recommended that En Core samplers be collected directly from the hand auger bucket, when possible. En Core samples should be collected before all other soil samples. Please revise the SAP to specify that En Core samples will be collected before all other soil samples and that VOC samples will be collected directly from the hand auger bucket.
12. **Section 6.3.3, Grab Soil and Groundwater Sampling Procedures, Page A.6-8; Section 6.3.4, DPT and HydroPunch Sampling Procedures, Page A.6-12; Section 6.3.7, Monitoring Well Sampling Procedures, Page A.6-19; and Section 7.3.1, Field Duplicates, Page A.7-9:** Chain of custody (COC) procedures for field duplicates are inconsistent. The text in item number 6 (Section 6.3.3, page A.6-8), item number 8 (Section 6.3.4, page A.6-12), and item number 15 (Section 6.3.7, page A.6-19) states that "FD" for field duplicate will be noted on the COC in the "QC" type column. Field duplicates can be collected for various quality control (QC) purposes, including consistency in field sampling and laboratory analytical procedures. For this reason, field duplicates should be submitted blind to the laboratory. Further, Section 7.3.1, Field Duplicates, states

that field duplicates will be assigned unique identifiers so that “the identity of the field duplicates is blind to the analytical laboratory.” Please modify the groundwater sampling procedures in Sections 6.3.3, 6.3.4, and 6.3.7 to be consistent with the Section 7.3.1 requirement for blind submittal of Field Duplicate samples to the analytical laboratory and clearly state that COCs should not be marked with “FD” in the “QC” column..

13. **Section 6.3.3, Grab Soil and Groundwater Sampling Procedures, Pages A.6-7 and A.6-8; Section 6.3.4, DPT and HydroPunch Sampling Procedures, Page A.6-12; and Section 6.3.7, Monitoring Well Sampling Procedures, Page A.6-19** It is unclear why the text of the last bullet in item 5 (Section 6.3.3) and item 7 (Section 6.3.4) requires use of a separate filtration apparatus and transferring the filtrate to the sample container when disposable in-line filters are available. Use of an in-line filter will minimize the oxidation of metals, minimize the potential for cross-contamination, and potentially reduce the amount of equipment that requires decontamination. Further, the monitoring well sampling procedures in Section 6.3.7 specify use of a 0.45 micron in-line filter. Please revise the procedures to specify use of 0.45 micron in-line filters or explain why use of a separate filtration apparatus is appropriate. In addition, if separate filtration apparatus is used, please specify that filtration will be done within 30 minutes of sample collection to minimize oxidation of metals.
14. **Section 6.3.7, Monitoring Well Sampling Procedures, Page A.6-18:** The text of item 10 indicates that low flow purging will continue “until water quality indicator parameters have stabilized or two tubing volumes have been removed from the well,” but it is unclear why tubing volume should be considered as important as parameter stability. Parameter stability is important because water quality parameters indicate when stagnant water has been removed from the well screen and sand pack in the vicinity of the tubing intake and that water representative of the aquifer will be sampled. Removal of two tubing volumes should be considered a default if parameter stability cannot be achieved. Please revise the low flow purging procedure to emphasize stability of water quality parameters (e.g., conductivity, pH, dissolved oxygen, and oxygen-reduction potential).
15. **Section 6.3.7 Monitoring Well Sampling Procedures, Page A.6-18:** The text of item 12 indicates that temperature, pH, and specific conductance will be monitored during purging, but temperature is not a good indicator because solar heating can impact the water temperature in the tubing. Further, dissolved oxygen is a critical parameter because it indicates whether VOCs have been lost through volatilization and metals have been oxidized. If possible, oxidation/reduction potential should be measured. In addition, it is unclear how these measurements will be made (e.g., using a flow-through cell, using aliquots from the discharge tube, etc.). Finally, there is a contradiction between items 12 and 13, in that item 13 specifies 6 water quality indicator parameters, but item 12 only specifies 3. Please revise the list of water quality parameters in item 12 to include dissolved

oxygen and to de-emphasize temperature and specify the type of equipment that will be used for water quality parameter measurements. Also, please resolve the inconsistency between items 12 and 13.

16. **Section 6.3.7 Monitoring Well Sampling Procedures, Page A6-19:** The third and fourth bullets on Page A.6-19 state that during groundwater sampling, volatile organic analyte (VOA) vials will be filled first, followed by other glass containers and then plastic containers. However, the order of collection by analysis is not specified. Containers should be filled in order of decreasing volatility. For example, VOA vials for VOC analysis should be filled before those for TPHp or TPHe. Similarly, SVOC containers should be filled before those for PCB or pesticide analysis. Please modify the text to specify the order that containers should be filled.
17. **Table A.5-2, Data Gap Sampling Locations, Depths, and Analyses, Page 1:** The reference in the last column (SAP Section) for the Site 7 - Soil Debris Area Soil Investigation, Unsaturated soil samples (Title 22 metals), is given as Section 6.3.1, but, Section 6.3.1 of the SAP details GORE Modules Sampling Procedures. It appears that this reference should have been assigned three rows above, to Site 7 Former Bldg 68 - 3 Soil Investigation, Unsaturated soil. Please correct these references.
18. **Table A.6-1, Field Equipment Calibration, Maintenance, Testing, and Inspection:** Footnote "a" states that a function check is first performed on the instrument. If the function check is acceptable, the instrument is ready for use, and if the function check is unacceptable, the instrument is calibrated. While the third column states that calibration occurs daily, footnote "a" appears to indicate that this calibration may be bypassed if the function check is acceptable. Please clarify the procedures described in this footnote.